

Remarks/Arguments:

Claims 1-9 are pending in this application. Claims 1-5 are rejected and the Office Action withdraws claims 6-9. The Office Action is non-final, however the restriction of claims 6-9 has been made final.

With respect to withdrawn claims 6-9, Applicants respectfully request reconsideration and the removal of the final restriction of claims 6-9 for the following reasons. Applicants contend that, in addition to the combustion of a Fischer-Tropsch tail gas, claims 1 and 6 each share the special technical feature of "an oxygen-rich gas comprising >90% oxygen" as set forth in claim 1 as "oxygen provided by an oxygen-rich gas comprising >90% oxygen" and in claim 6 "means to introduce an oxygen-rich gas comprising >90% oxygen". The Office Action asserts that U.S. Patent No. 6,172,124 ("Wolflick") discloses "combustion of the tail gas using a gas turbine" and concludes "therefore there is no special feature that links the Group I and II together." (Office Action, page 2). However, Applicants contend that Wolflick only teaches air as an oxidant either for the syngas generation step (the "remaining portion" of compressed air is fed to the "first reactor") or for the combustion of the tail gas itself (the "first portion" of compressed air is fed to the combustor in the gas turbine), in contrast to Applicants' oxygen-rich gas stream comprising >90% oxygen. Thus, Applicants' claimed process provides improved efficiency in the integrated process as is discussed more fully in addressing the obviousness rejections below. Therefore, Applicants respectfully traverse the restriction requirement, based on Wolflick, and respectfully request that the restriction of claims 6-9 be withdrawn.

With respect to corrections to the application required by the Office Action regarding the headings as required under 37 C.F.R. § 1.77(b), Applicants have amended the specification accordingly. Also, Applicants have also included an abstract as required by the Office Action in order to comply with 37 C.F.R. § 1.72(b).

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as unpatentable over WO 00/09441 ("Abbot") in view of Wolflick. While not specifically stated by the Office Action, it appears that claims 2-4 are rejected as obvious over Abbot in view of U.S. Patent No. 5,245,110 ("Van Dijk"). Applicants respectfully traverse these rejections and respectfully submit that the

currently pending claims are patentable over the art of record for at least the reasons set forth below.

Features of Independent Claim 1 (and Claim 6)

Applicants invention as claimed in claim 1 is a process for the production of hydrocarbons including the steps of: "combusting at least a part of said tail gas to produce a combustion gas" and "using said combustion gas to drive a turbine, thereby to produce power from said turbine." In other words, claim 1 requires that at least part of the tail gas is combusted and the resulting combustion gases are used to drive a turbine to generate power. In addition, claim 1 also includes the feature of the oxygen (used for combusting the primary reformed gas as it is subjected to secondary reforming) be provided by an oxygen-rich gas comprising >90% oxygen.

Independent claim 6, while not identical to claim 1, includes features that are similar to claim 1.

Response to Obviousness Rejections - Abbott in view of Wolflick

The Office Action rejects claims 1-5 as obvious over Abbot in view of Wolflick. With regard to the basis for the obviousness rejection, Abbot teaches a production of synthesis gas using a two-step synthesis gas generation process for synthesizing carbon-containing compounds in which, as the Office Action admits, "the tail gas is recycled to the reformer." (Office Action, page 4). The Office Action asserts that Wolflick "in a process for converting gas to liquid teaches that Fischer-Tropsch tail gas contains sufficient energy to combust it and pass it through a turbine." (Office Action, page 5). (Applicants note that Wolflick discloses such a process for use in an Autothermal Reforming Unit. (col. 2, lines 48-50).) Therefore, the Office Action concludes that it would have been obvious "to use an available stream which is known to contain energy by combusting part of the tail gas to drive a turbine" (Office Action, page 5).

No Teaching in Art to Suggest Desirability of Claimed Invention

Applicants contend, however, that the Office Action has improperly combined the two references as there would be no motivation for one of ordinary skill in the art to combine the two references as the Office Action asserts. Abbot teaches a process in which carbon dioxide is recovered from synthesis gas (the de-watered secondary reformed gas stream) before or after the hydrocarbon synthesis. (Abbott, page 14). Applicants assert, as the Office Action admits, that Abbot further teaches that at least part of the tail gas (unreacted gas stream) may be recycled to the reformer as the recycled carbon dioxide to the synthesis gas generation step. (Office Action, page 4; Abbott, page 15, claim 6). However, Abbott is silent with regard to gas turbines or the generation of power from the tail gas. There is not even a teaching, disclosure or suggestion in Abbott that the tail gas from the Fischer-Tropsch reaction may be used for any other purpose except to provide carbon dioxide to the reforming process as to achieve an optimum hydrogen to carbon monoxide ratio for the Fischer-Tropsch synthesis of hydrocarbons, much less a suggestion of using such a tail gas for generation of power in a gas turbine. Also, removing the tail gas as a source of carbon dioxide fed to the reforming stages according to Abbott and feeding it instead to a gas turbine, as the Office Action asserts is obvious to do in view of Wolflick, would upset the hydrogen to carbon monoxide ratio in the resulting synthesis gas required for the Fischer-Tropsch synthesis of hydrocarbons. Therefore, Applicants contend that Abbott provides no motivation for one of ordinary skill in the art to consider using the tail gas for any other purpose (including as a fuel in a gas turbine as purportedly taught by Wolflick) other than as a source of recycled carbon dioxide to adjust the hydrogen to carbon monoxide ratio.

Proposed Modification Renders Art Unsatisfactory for its Intended Purpose

Further, Applicants contend that the combination of the references as the Office Action asserts, i.e. re-directing the tail gas from the synthesis gas generation step of Abbott to a gas turbine to generate power, would render the references unsatisfactory for their intended purpose. According to the M.P.E.P. § 2143.01, "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion

or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984)"

Applicants assert that the synthesis gas generation step of Wolflick uses air as the oxidant in an Autothermal Reforming Unit (col. 2, lines 48-50), which is different than the two-step synthesis gas generation process disclosed in Abbott, thereby resulting in significantly different tail gases from each process. As stated in Wolflick, "By using tail gas to fuel the gas turbine, less of the compressed combustion-cooling air has to be used to cool the combustion gases (i.e. exhaust gases) from the combustor of the turbine and, instead, can be used to provide a portion of the process-air required in the process." (Wolflick, col. 2, lines 13-18). The reason that less compressed combustion air is needed for cooling the combustion gases is because the extra mass flow of the high nitrogen-containing tail gas from the Fischer-Tropsch process keeps the combustor turbine gases cooler. (Wolflick, col. 2, lines 32-37). Applicants assert that if an oxygen-rich gas instead of air were used in Wolflick's reforming process, the volume flow of tail gas would be considerably lower and there would be little or no nitrogen in the tail gas to effect this cooling. Therefore, Applicants submit that because Wolflick requires air as the oxidant, there would appear to be no efficiency gains unless the Fischer-Tropsch tail gas contains high levels of nitrogen, i.e. unless the reforming process uses air as oxidant, and thus the Office Action's combination of Abbott with Wolflick would render Wolflick unfit for its intended purpose. Likewise, because Wolflick teaches using air as the oxidant, combining Abbott with Wolflick would render Abbott unfit for its intended purpose. The Office Action's own admission (in applying the Van Dijk reference to claims 2-4, Page 5): "It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an oxygen rich gas stream because if other than substantially pure oxygen is used, diluants in the air (e.g. N₂) will require the use of a much larger reactor" makes this very point and further supports Applicants' position. The Office Action, therefore, has not made a *prima facie* case of obviousness based on Abbott either alone or in combination with Wolflick.

Response to Obviousness Rejections - Abbot in view of Van Dijk

The Office Action argues that Applicants' claims use an "air separation unit to provide an oxygen rich gas for combusting the primary reformed gas" whereas "Van Dijk discloses a

process for the separation of oxygen from air integrated with the production of synthesis gas, followed by Fischer-Tropsch conversion." (Office Action, page 5). The Office Action rejects the claims as obvious over Abbott in view of Van Dijk because one of ordinary skill in the art would "use an oxygen rich gas stream because if other than substantially pure oxygen is used, diluants in the air (e.g., N₂) will require the use of a much larger reactor." (Office Action, page 5).

Applicants submit that the Office Action's comments directed to the air separation unit appear to be a rejection of claims 2-4. For at least the reasons set forth above with regard to the rejection of independent claim 1 under Abbott in view of Wolflick, the dependent claims are patentable over the references of record.

In addition, Applicants assert that the Office Action's characterization of Van Dijk's oxygen-rich gas stream as "substantially pure" is misguided, and therefore the rationale on which the rejection is based is improper. Van Dijk describes a process wherein an air separation unit in combination with a gas turbine is used to provide oxygen-enriched air for adiabatic reforming a hydrocarbon feedstock. Because of the separation techniques used, the oxygen-enriched air contains high nitrogen content (at least 40 mole %) and the resulting synthesis gas therefore also contains a high quantity of nitrogen (Van Dijk, col. 7, lines 16-20; col. 7, lines 48-53; and col. 8, lines 51-54). This nitrogen ultimately ends up in the Fischer-Tropsch tail gas. (col. 8, lines 41-51). Van Dijk further teaches that the high volume flow of nitrogen in the tail gas is desirable to obtain high levels of oxygen enrichment and control of the turbine inlet temperature. (col. 12, lines 12-39). Applicants contend that because the oxygen-enriched air of Van Dijk includes such high N₂ content, which cannot be compared to Applicants' >90% oxygen gas stream, for the same reasons why the combination of Abbott and Wolflick is improper, the combination of Abbott and Van Dijk is also improper. The Office Action's own statement, "if other than substantially pure oxygen is used, diluants in the air (e.g., N₂) will require the use of a much larger reactor," shows the lack of motivation for one skilled in the art to combine the two references. Therefore, Applicants contend that the claims are patentable over Abbott either alone or in combination with Van Dijk.

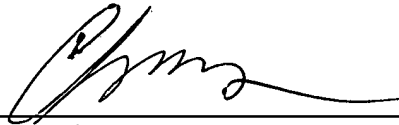
CONCLUSION

Applicants contend, therefore, that independent claim 1 is patentable. Claims 2-4 are also patentable over the art of record at least for the same reasons that claim 1, on which they are dependent, is patentable, but may be separately patentable for additional reasons as well.

Applicants also submit that the above-noted arguments are also relevant to claims 6-9 and, accordingly, render claims 6-9 nonobvious over the art of record.

In view of the arguments set forth above, Applicant respectfully submits that the claims in the above-identified application are in condition for allowance.

Respectfully submitted,



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